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THE

PORCELAIN PICTURE;

OR,

Full Instructions How to Make Photographs

ON

PORCELAIN OR OPAL GLASS.

BY

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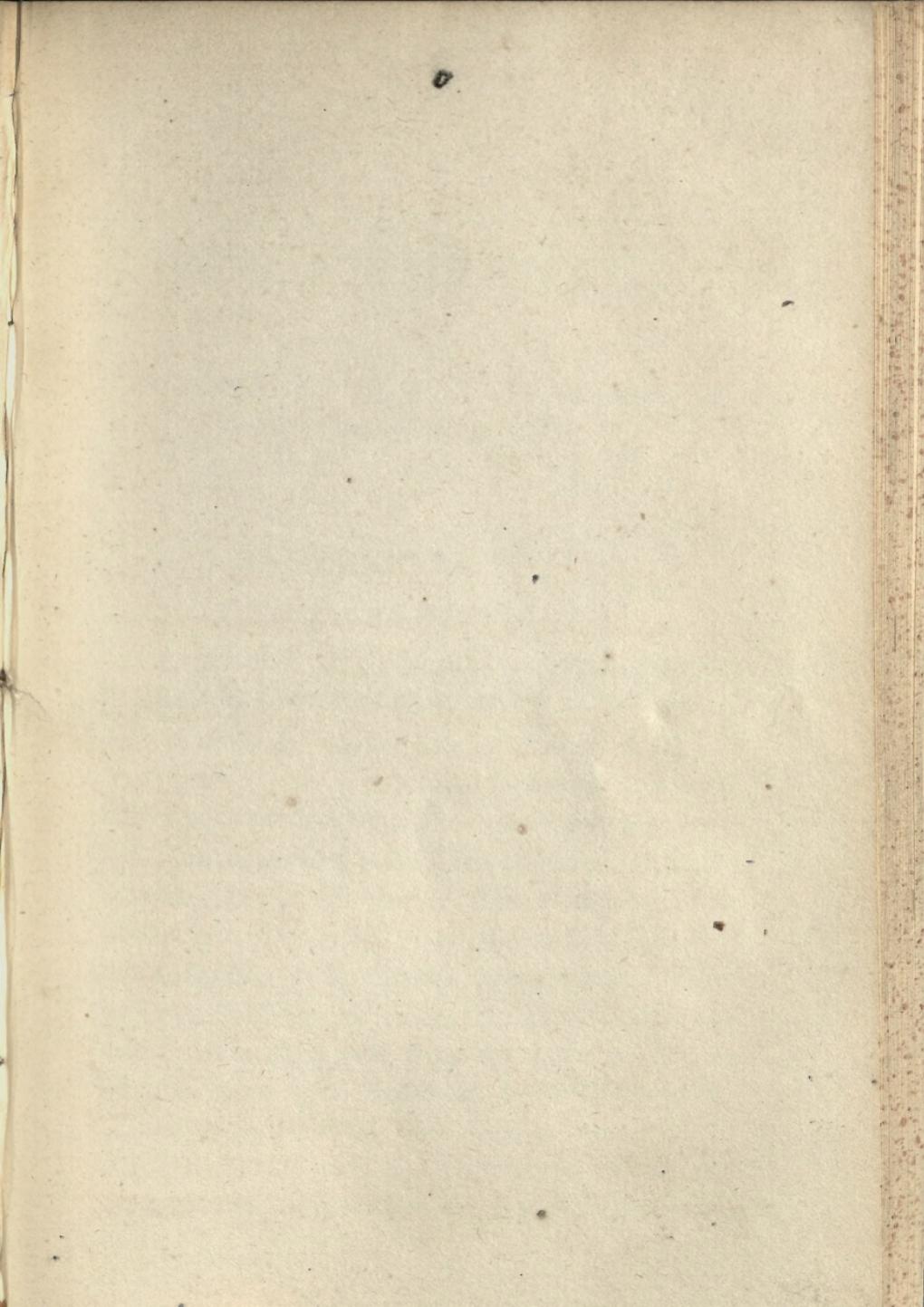
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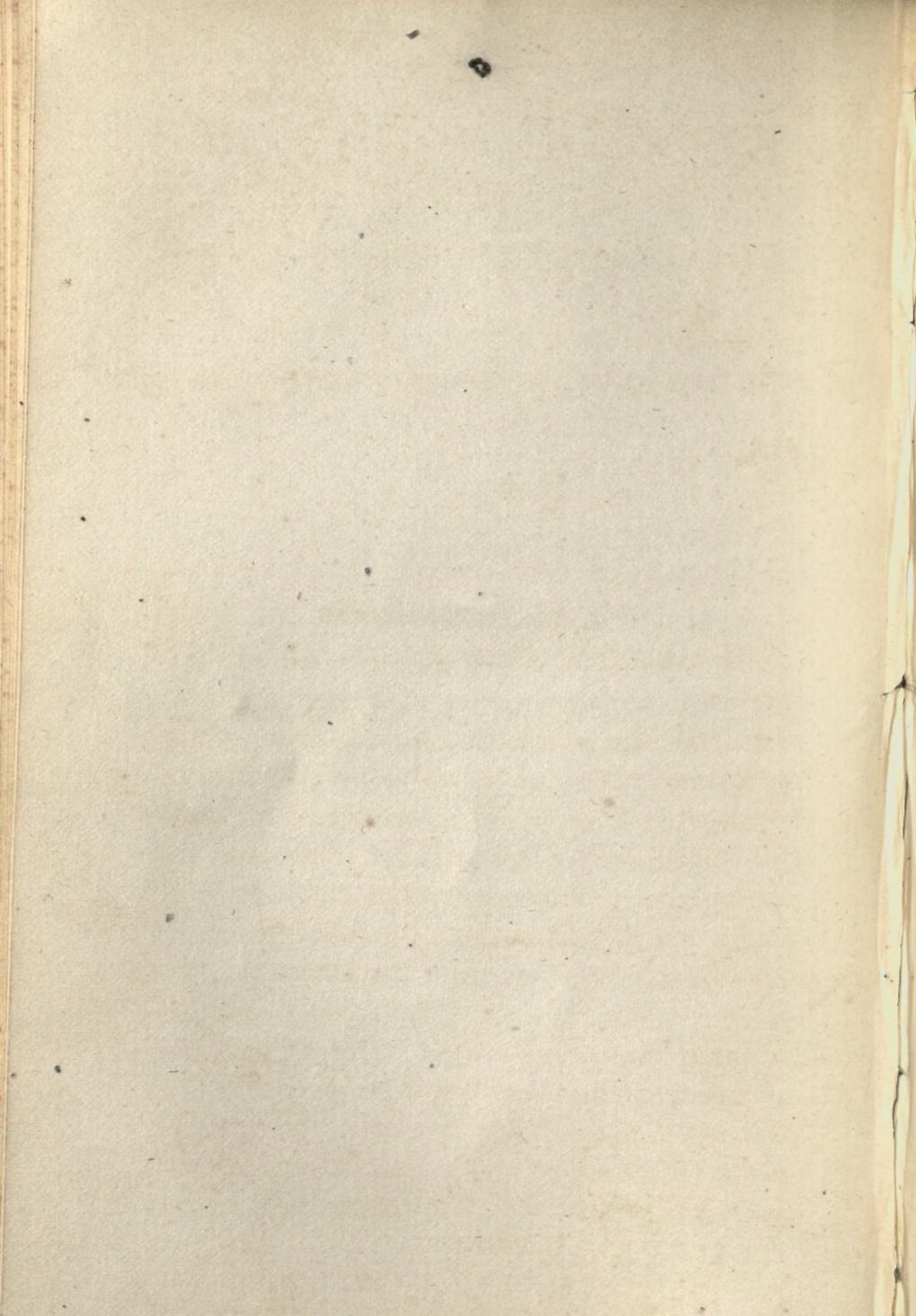
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THE PORCELAIN PICTURE;

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INSTRUCTIONS HOW TO MAKE A PHOTOGRAPH ON
PORCELAIN OR OPAL GLASS.

CHAPTER I.

PORCELAIN—OPAL GLASS.

THE material on which the porcelain picture is taken is a combination of silica, an alkali, and a metallic oxide, as, for instance, of tin or arsenic. This mixture is submitted to a high temperature, which is continued for some time, until perfect fusion takes place, and the combination is effected. The resulting compound is a species of glass of a milky hue, not transparent, but simply translucent. The greater quantity of porcelain plates now for sale is manufactured with no greater degree of care than that bestowed upon the fabrication of common window glass ; this is to be regretted, because the curvature of surface, and other inequalities, render such porcelain

plates unfit for printing photographically by contact. It is to be hoped that, as the demand for porcelain plates increases, manufacturers will supply the trade with plate porcelain, on which photographs can be taken equal to the finest specimens of portraiture on ivory.

Opal glass differs from porcelain in this particular: it is a combination of two sorts of glass in thin layers superimposed and fused together. Thus a layer of opaline or milky glass is fused on the surface of common transparent crown or plate glass. The porcelain side is afterward ground smooth and polished. This combination is an imitation of the mineral opal on which cameos and intaglios are cut; and by artistic manipulation, by means of colored vignettes behind the photograph and stippling the photograph itself, some of the richest specimens of photographic workmanship may be executed, having some resemblance to cameos.

The layer of porcelain in this sort of artificial opal must not be ground down too thin, otherwise the combination will become transparent, and the transparent positive on its surface will thus become deteriorated; on the

other hand, the layer must not be too thick, otherwise the compound will be reduced to the condition of ordinary porcelain, and its opal character entirely obliterated.

Opal glass, prepared as above described, must naturally be quite an expensive article, and on that account will not come into vogue or be vulgarized. Besides that, the preparation of an opal picture, that shall be truly worthy of the name, can be executed only by a photographer who is at the same time an artist. Specimens, therefore, in this department will be reserved as a monopoly by two or three galleries in our principal cities, such as New York, Philadelphia, and Boston; for it is there only where such artists meet with patronage and support.

Porcelain glass can be obtained from the dealers, of the following sizes:

SIZES OF PORCELAIN PLATES.

$\frac{1}{8}$ plate.....	$2\frac{1}{2}$	by	$2\frac{1}{2}$	inches.
$\frac{1}{6}$ "	$3\frac{1}{4}$	"	$2\frac{3}{4}$	"
$\frac{1}{4}$ "	$4\frac{1}{4}$	"	$3\frac{1}{4}$	"
$\frac{1}{3}$ "	5	"	4	"
$\frac{1}{2}$ "	$6\frac{1}{2}$	"	$4\frac{3}{4}$	"
$\frac{3}{4}$ "	$8\frac{1}{2}$	"	$6\frac{1}{2}$	"

Stereoscopic size, and other extra sizes, may be had by ordering.

CHAPTER II.

THERE are two methods by which porcelain pictures may be produced, the one by the wet process, and the other by the dry process ; and these two methods admit of several minor subdivisions. We shall describe the principal, that is, those which we regard as practically the best of these methods, carefully and minutely ; and the rest we may briefly advert to, or entirely omit, as circumstances require, before we get to the terminus of our project.

HOW TO TAKE A PORCELAIN PICTURE BY THE WET PROCESS.

In the first place we require a conjugate camera for this operation. A conjugate camera is, in fact, a copying camera ; but the copying camera, to be of universal application, is so arranged, that whatever may be the change in the focal distance of the negative to be copied, the bellows or draw part of the camera may be adjusted in conjugate focus.

The copying camera may be constructed by any operator, who is endowed with some degree of mechanical genius. The one we use

was constructed long before the war commenced ; we made it for the purpose of copying stereographs.

The length and other dimensions of the conjugate camera will depend upon the focal power of your lens and the maximum size of the picture to be copied. We will fix those points right away, and then describe the whole construction in conformity with the limiting conditions.

You have a lens, you say, a globe lens ; you could not have a better for the purpose ; you may have, however, several lenses that will work quite as well, such as those from Dallmeyer, Ross, Roettger, Fitz, Voigtlaender, etc.

Hold the lens in the direction of the sun's rays and ascertain the distance of its burning point, by causing the converging pencil of light to fall upon a piece of white paper. An assistant can measure this distance while you are making the adjustment accurately. Let the distance thus found be 4 inches. It is important to know this distance, because from its knowledge we can arrange the distance of the negative from the lens as we like, and therefrom tell what must be the distance of the collodionized plate in order to produce a given

sized picture; for instance, if we require a picture equal in size to the negative, the distance between the collodion plate and the negative will be four times the focal power, or 16 inches; in the present case, the lens being half way between.

Furthermore, we will suppose that the maximum plate you wish to make is 12 inches by 10; and that a $\frac{1}{4}$ plate is the minimum size of the negative to be used.

With these data we proceed at once to the description of a camera adjustable to foci varying from the equal conjugate focus to a plate $8\frac{1}{2}$ inches by $6\frac{1}{2}$ in one direction, or from the same point of beginning to a microscopic picture, whose diminution in magnitude in this direction is equal to the increase in the other direction.

The ratio between a $\frac{1}{4}$ plate and a whole plate is nearly as one to six, that is, the large plate is six times larger than the small one which is to serve as negative.

Now, multiplying the ratio of magnitude plus 1 by the focal length of the lens, produces the distance of the collodion plate from the lens; and, dividing this distance by the ratio of magnitude, gives the distance of the

negative from the lens : thus $6+1\times 4=28$ for the first distance ; and $28\div 6=4\frac{2}{3}$ for the second distance. From this we infer that the ground glass and the negative must have a range between $4\frac{2}{3}$ inches and 28 inches on either side.

Take a smooth board, 66 inches long and sufficiently wide to receive the two bases of two $\frac{1}{4}$ cameras, the range of whose ground glasses varies from at least $4\frac{2}{3}$ inches to 28 inches from the lens ; fix the lens on the end of one, and then screw them together endwise in perfect apposition on the board in question. One camera is to hold the negative, the other the collodion plate.

It is evident with such an arrangement pictures can be made of any size, varying from $\frac{1}{2}$ an inch by $\frac{1}{16}$ to $8\frac{1}{2}$ inches by $6\frac{1}{2}$ inches, from the same negative on a $\frac{1}{4}$ plate.

Thus, for instance, we will suppose a picture has to be taken from the negative of the same size as the negative. Place the negative in the holder, and adjust its distance from the middle of the lens to 8 inches ; on the other side of the lens fix the collodion plate at the same distance ; the picture will be found to be *nearly* in focus, and *quite* in focus if all the measurements are correct.

Secondly, to make a $\frac{1}{4}$ picture from a $\frac{1}{6}$ plate the distances are as follows :

Negative from lens.....	$6\frac{2}{3}$ inches.
Collodion plate from lens.....	$10\frac{1}{2}$ "

Thus it appears that each lens may have a table constructed and attached to the camera, by which it may be seen at a glance what distances will produce a given effect.

The table for the globe lens, whose focal power is 4 inches, and the negative plate $3\frac{1}{4}$ by $2\frac{3}{4}$ inches, is as follows :

Negative from lens.	Collodion plate from lens.	Size of the picture.
8 inches.....	8 inches.....	$\frac{1}{6}$
$6\frac{2}{3}$ "	$10\frac{4}{5}$ "	$\frac{1}{4}$
$5\frac{1}{2}$ "	13 " nearly ..	$\frac{1}{3}$
$4\frac{7}{10}$ "	26 "	$\frac{1}{2}$
$4\frac{2}{3}$ "	28 "	$\frac{3}{4}$

Further information on this subject may be obtained by referring to the 256th page of the *Sunbeam*.

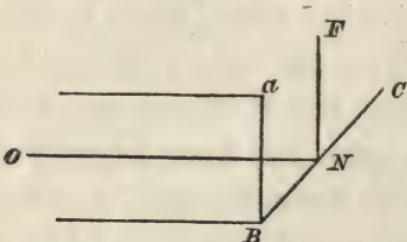
The camera need not be longer than about 32 inches, if the operator has no intention to diminish his pictures ; and this will frequently be the case. In such instances a second camera is dispensed with ; and an arrangement is made at the end of the camera used, by means of a cylindrical attachment, to move the lens

nearer to or from the negative, which is kept stationary. The rule for distances remains the same as before.

The ground glass is adjusted to focus by the bellows part of the camera. As soon as the negative is in its place, the distances marked out, and an accurate focus has been taken, the camera is placed in an open window, and inclined so as to receive light directly from a white cloud, a heap of snow, or a white screen. It is, however, not always convenient or agreeable to work at an open window; and the side window may open against a brick wall, green foliage, or some other disagreeable impediment to actinic action; in such a case it is advisable and very practical to receive the light from the sky-light, which impinges upon a white screen inclined at an angle of 45° in front of the negative, and is thus reflected directly upon the negative and perpendicular to it.

Such a screen is made in the following manner: Construct a plain picture frame of the same size as a cross section or end of the camera; this frame swings on two brass buts at the bottom which are screwed on to the end of the camera. The frame so adjusted has a motion

like one side of the binding of a book, when the latter rests on its back and perpendicular to the table, as in the annexed diagram, in



which $a\ B$ represents the end of the camera, and $B\ C$ is the movable frame. The latter is supplied with a glass

and a thin board behind to keep it in its place. The glass looks toward $a\ B$ on the negative. Unscrew the frame $B\ C$ from the end of the camera, lay it upon its face, take out the thin board, and, after having cleaned the glass, replace it on the ledges for its reception. Now take a sufficient quantity of gypsum or plaster of Paris, and by means of cold water make it into a thin paste. This, when uniform in consistency, is poured upon the back of the glass as it lies in the frame until the layer is about three-sixteenths of an inch in thickness. This layer is allowed to indurate and dry. The thin board is then fixed in its place in order to protect the plaster and to prevent its falling out. The frame is finally screwed to the end of the camera, and inclined at an angle so as to conduct the light perpendicularly upon

the negative. Thus, let $F'N$ be a ray of light from the sky-light, and perpendicular to the floor; in this case the frame must incline 45° from aB in order to make the ray No pass perpendicularly upon the negative, and in the direction No . The camera is supported on a tripod in the usual manner; and, being arranged as just described, we are now in a condition to proceed in our instructions.

CHAPTER III.

MANIPULATIONS IN TAKING A PICTURE ON PORCE- LAIN BY THE WET PROCESS.

As soon as the camera is all in order, the next operation consists in taking a negative suitable for the purpose. This is no easy matter with your present conceptions about negatives, derived from your experience in room-work ; as a certain thing, you will make your negative as dense as for the photograph of a card-picture, and will thus have to unlearn much that you have already learned. Whether you copy from an engraving or from nature, one rule acquired from experience is this : expose long enough to get detail—in fine, expose a little too long ; for, without detail your picture may look clean, but it will not be artistic ; it will be a mere black and white daub.

The developer must be one that works slowly, but gradually, so that the high lights are kept back, or restrained, until the fine markings get a start. The following developer is found to be very efficacious in cases of this description :

DEVELOPER.

Double sulphate of iron and ammonia,	2 drs.	3
Protosulphate of iron.....	2 "	3
Water	8 ozs.	12
Acetic acid.....	2 "	3
Alcohol	6 drs.	9

If the picture flashes out too quickly add more acetic acid, or diminish the time of exposure in another attempt. With this developer you can watch proceedings easily enough. As long as there is no appearance of fog, proceed until the proper intensity is obtained. *Above all things*, keep the picture bright and transparent. Finally, wash ~~the~~ the negative well, and fix as usual with cyanide of potassium, or hyposulphite of soda.

The nitrate of silver bath we prepare in the following manner :

Recrystallized nitrate of silver.....	4 ozs.
Distilled or rain water.....	48 "

After solution, the bath is tested with a piece of blue litmus paper to see whether it is acid or not ; if it is, the litmus paper after a while becomes red when immersed in the fluid. In this case, we boil the whole solution in a large glass flask or retort, or in a porcelain dish placed in a sand bath with an addition of

10 grains of oxide of silver. This oxide is prepared as follows :

Dissolve 1 drachm of potassa in 4 drachms of water, and then drop into the solution some of the silver solution as long as a brownish precipitate is formed. Let this substance settle, and then pour off the liquid above it. Add water to the sediment and shake the mixture well, and when the precipitate has again settled, pour off the water, and repeat the operation several times, until the water which has been used for washing the sediment no longer restores the blue color to red litmus paper. The washed and moist oxide of silver is preserved for future use.

After the bath has been boiled about a quarter of an hour with the oxide, its acidity will have been removed. We then divide the bath into two halves ; and one of these we saturate, by boiling with 5 grains of iodide of silver, which is prepared as follows :

Take a drachm of iodide of potassium and dissolve it in 4 drachms of water ; add to this solution some of the silver bath, drop by drop, as long as there is a yellow precipitate formed ; let the precipitate settle, pour off the supernatant liquid, and wash the deposit several times

in the same manner as the oxide was washed. Keep the iodide moist and ready for use when required.

After boiling one-half of the silver solution with iodide of silver, it is taken from the sand bath and filtered ; the other half is added to the filtrate, and the whole is then filtered a second time through fresh filtering paper. This bath is very sensitive, because it is quite free from all extraneous matter ; it will not be apt to produce pinholes in the negatives, because it is not saturated with iodide of silver ; it may, however, have a tendency to produce fogginess, because it is very sensitive and quite neutral ; this will especially be the case with a colorless or new collodion. Add, therefore, a drop or two of acetic acid until the trouble is overcome. The following collodions work well :

No. 1.

Ether	25 ozs.
Alcohol	25 "
Tincture of iodine.....	24 mins.
Iodide of cadmium.....	48 grs.
Bromide of cadmium.....	32 "
Iodide of ammonium.....	126 "
Bromide of potassium.....	44 "
Pyroxyline	7 " to the ounce (more or less, according to its solu- bility, or the requirements of the case).

No. 2.

Alcohol.....	12 ozs.
Ether	10 "
Iodide of ammonium.....	110 grs.
Bromide of potassium.....	44 "
Pyroxyline.....	7 " to the ounce, or more, etc.

The collodion for our present purpose must not be thick and glutinous, otherwise the film will be full of reticulations, which will be reproduced in copying. Some persons prefer an old collodion for the preparation of opal or porcelain pictures; for, by means of the free iodine in the collodion, they are enabled to produce clearer pictures. Such collodions, however, are less sensitive than freshly prepared specimens; and will not, therefore, produce the same amount of detail in the same time. We do not think we err by recommending a new collodion, and we pretend, by tincture of iodine in the collodion, or acetic acid in the silver bath, and an appropriate developer, to be enabled to obtain a better result than with an old collodion.

If, after fixing and washing, the negative is not quite free from fog, but yet there is an abundance of detail, the negative may perhaps

bear clarifying, although we think it better to take a new negative.

The negative is clarified in the following manner :

TO CLARIFY THE NEGATIVE.

Prepare tincture of iodine, by dissolving 4 grains of iodine in 4 drachms of alcohol. Pour 4 drops of this solution into 2 drachms of water, and then pour the mixture, after shaking, over the still wet negative ; keep the mixture moving about a few seconds, and then pour it back into the vial and wash the film. Now pour over the film a dilute solution of cyanide of potassium, which will remove the fog and leave the picture clear. After this, the negative is washed, and intensified slightly, if required. But if the gradations of light and shade are good, and the intensity of the high lights by no means so great as in negatives for paper prints, the results will be good in this sort of printing by means of the lens. In most instances no intensifying is required, if the development in the first instance is carefully managed. The reader will gain a better criterion of what amount of intensity is required by purchasing a transparent positive

stereograph by some of the European artists, as, for instance, by England, Ferrier, Braun, etc. The exact same amount of intensity seen in the positive must exist in the negative. Anthony, in New York, keeps a large stock of such transparent positives for sale ; he will select you one for the purpose ; study upon it until you can get a negative endowed with the same appearance. Let me here impress upon you distinctly the necessity of first getting a clear, sharp, bright negative, full of detail, and agreeable gradation of shade, before you make any attempts at preparing a porcelain picture.

Having succeeded with the negative, place it wrong side up in the plateholder, with the film toward the lens. The plateholder for this purpose requires neither slide nor shutter ; the negative is kept in its place by means of small springs or pins in the corners. If the picture is to be square, oblong, oval, etc., a mat of the required shape is placed over the negative and in contact with it. If, however, the picture is to be represented in vignette, an oval or elliptical opening is made in a metal or wooden partition in the space, either in front of the lens or behind it, through which

the rays from the negative have to pass. You will naturally understand that the negative in its present position must lie in a plane perpendicular to the base, every part of which is equally distant from the plane in which the lens is fixed, or in which the collodionized plate is held. If it deviates but the one-tenth part of an inch in any part, you can not succeed in getting a good picture. See to this before you take a copy.

In order to obtain a sharp picture on the ground glass you require a focusing glass, or still better a pair of spectacles of very short focus, such as those used by very aged people. It requires more skill to focus here than in taking a card-picture. Fix upon some sharp line, or very small aperture, or the distinct outline of a leaf, or the interspaces in a window, railing, etc., that may happen to present themselves, and move the bellows part of the camera backward and forward until the picture is quite sharp. Of course, the negative is first placed in a position to produce a given sized picture ; this position can be seen by referring to the table in chapter second, or to the more extended table in the *Sunbeam*.

The porcelain plate next requires our atten-

tion. It is first cleaned and polished like any other plate, and then coated with collodion; the collodion film is then sensitized by immersion in the silver bath. After the film has assumed a cream-like color, and is free from oleaginous undulations, the plate is taken out, drained, and transferred to the plateholder, which in its turn is inserted in its grooves in the copying camera. The slide is drawn and the plate exposed. The time required you have to learn. With the smallest stop in the globe lens, and light from the sky-light, you can try one minute as an experiment, and see the result. This probably will be too short an exposure, but it will give you an idea how much too short it has been, and you can act accordingly. Having once got the right time with a given light, you will have but little difficulty afterward in hitting upon the proper amount of exposure with any other light from the same quarter.

The picture is developed by means of the same solution already given. Watch the development carefully, and stop before the least veil or fog supervenes; finally, wash the film and fix the picture. If the latter is full of detail, is sharp and bright, and in every sense of

the word free from cloudiness or fogginess, you have so far succeeded.

The second step in the operation consists in toning the picture, if it is already intense enough; or in redevelopment or intensifying the picture, if the picture is not intense enough.

The picture, we will suppose, lacks in density, but the detail is complete. The transparent positive is still wet; flow over it a sufficient quantity of the mixture of water and tincture of iodine, such as was used in the clarifying process; move the solution backward and forward upon the plate until the film assumes a gray-rosy hue; then pour back into the vial the residue. If the positive requires but a small amount of intensifying, this deposit of iodine will not be necessary; and, as soon as the film is well washed, we should proceed at once to the next step.

Make the following solutions:

Pyrogallic acid.....	12 grs.	}	Stock solution
Acetic acid.....	1 oz.		

For present use take:

Of stock solution 1 dr.	}	Present use solution.
Water..... 7 drs.		

To intensify the picture take :

Present use solution 4 drs.
Nit. of silver solution 20 grs. to the oz. 10 drops.

Pour this solution upon the wet film, and keep it in motion until the desired intensity is obtained.

TONING THE PICTURE.

The tone of the positive is not agreeable at this stage, that is, as a positive ; our next and final step, therefore, is to change the hue and give it a rich black, or blue-black tone. This is effected in the following manner :

TONING SOLUTION.

Terchloride of gold (neutral) 1 gr.	} Stock solution.
Water..... 1 oz.	
Of stock solution..... 6 drops.	} Present use.
Water..... 4 drs.	

Cover the film with the latter solution, and keep it in motion until the desired tone has been attained. Finally, wash thoroughly, and dry the film. The picture-side of the plate is now varnished with a colorless flint varnish, such as is used for ambrotypes.

Porcelain pictures are mounted in various ways ; some are placed in cases such as are used for ambrotypes or melanotypes, with

this difference, that either the back of the case has an oval or vignette opening, or that the picture itself is so arranged as to be independent of the back or front lids. In the latter case a mat is placed on either side of the porcelain plate ; and when the preserver is fixed, the picture moves on hinges, and acts like the leaf of a book. Much beauty is also communicated to the picture by fixing a colored plate of glass behind it, and then the mats, etc.

A very common application of the porcelain picture is its substitution for the panes of glass in lantern or lamp shades.

The porcelain picture, mounted in elegant and light frames, is frequently seen taking the place of embossed porcelain containing scriptural pieces, and suspended in parlor or drawing-room windows. The effect is quite pleasing.

The porcelain portrait, in vignette style, can be colored like any other photograph ; but, when colored artistically by stippling, etc., it surpasses in beauty and softness any other photographic production. It is in this department of portraiture, that the artist-photographer can display the extent of his genius and acquirements to the best effect, and with

the richest remuneration ; for the results are indescribably charming, and people of wealth and taste are willing to possess whatever flatters vanity, either by superiority of execution or expense of production.

CHAPTER IV.

TO TAKE A PORCELAIN PICTURE BY THE DRY PROCESS.

A NEGATIVE which is good for the wet process, is equally good for the dry process.

The information which the student has to acquire, consists, therefore, in reference to copying upon opal or porcelain by means of some of the numerous dry processes. In all of these processes it is absolutely necessary that the negative and porcelain plates be perfectly flat, otherwise perfect apposition of the two surfaces can not take place, and where this defect occurs, the picture is blurred.

As in printing on paper, so in printing on glass there exists two independent methods, that is, direct or solar printing, and printing by development. In the former method we take advantage of the effect of light alone in changing the color of chloride of silver ; and in the latter of the actinic effect of light in instituting a molecular change in the iodide or bromide of silver, which effect is latent or not apparent until it is brought out or developed

by the application of some reducing agent, such as gallic or pyrogallic acid.

The first method we shall describe is that of direct printing on glass by contact with the negative. For this purpose we require a printing frame of a peculiar construction; otherwise, that is with the common printing frame, we could not from time to time examine the progress of the printing, owing to the impossibility of bending the glass so as to get a glance beneath it in the same manner as we are in the habit of doing with our paper prints.

The porcelain printing-frame, therefore, is of a peculiar construction, opening like a book, and still retaining both the negative and the porcelain from slipping out, but permitting the operator to examine the condition of the print, and then to close the frame again, which again brings the negative and porcelain plate into apposition, without having changed their relative position in the slightest degree. This porcelain printing-frame is the production of the ingenious Mr. Shive, of Philadelphia, who is better known by his heliotropic solar camera. The frame is manufactured for John H. Simmons, of Philadelphia, and may be had undoubtedly by this time from any of our photo-

graphic dealers. It is indispensable in this mode of printing.

The first step to be taken, after the porcelain plates have been cleaned and polished, is to coat them with salted albumen, such as is used in the preparation of albumen paper.

Take the whites of six fresh eggs and beat them into a froth, and then allow the froth to settle for about twenty-four hours. Remove the scum that has concreted on the surface, and separate the clear albumen.

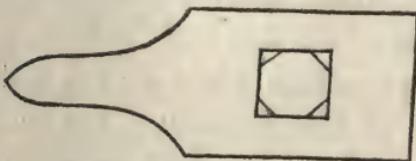
SALTING SOLUTION.

Clear albumen.....	4 ozs.
Chloride of ammonium.....	40 grs.
Water	4 drs.

Dissolve the salt in the water, and then intimately mix the solution with the albumen. Now take a clean porcelain flat dish, sufficiently large to hold a porcelain plate on the bottom. At each end of the bottom of the dish place a slip of glass about an inch in width, and reaching from side to side. Pour sufficient of the salting solution into the dish so as to cover the glass slips with a thin film of about one thirty-second of an inch in thickness. Resting one end of the porcelain plate on one

glass slip, lower the other end gradually until the plate lies flat in the fluid, but not covered by it. By lowering the plate in the manner described the under surface will be covered with albumen, and without bubbles of air. The plate is now raised out of the albumen, and holding it between the thumb and forefinger, salted albumen is poured upon its surface just as you would coat a plate with collodion. Allow the excess to flow off at one corner, and then quickly leveling the plate to a horizontal position, allow the remaining albumen to flow back so as to form a uniform film.

The next operation is to dry the film. Construct, in the first place, an albumen plate-holder of thin wood, of the following shape:



The rectangular central part is cut out clear through; this aperture has

the same size as the plate whose film is to be dried. The triangular corner pieces are of glass; they are squares in reality, the remaining part, or three-quarters, being inserted in the corners present ledges for the albumen plate to rest upon. The wet albumen plate being laid

upon its angular supports, the operator takes the holder in his hand, and keeps the plate in motion over the top of a warm stove, in order to equalize the film as it dries. When dry the plates are stowed away in a dry place, free from dust, until required for the printing operation. The reader will observe the perfect similarity between the albumen film on glass and that on paper ; from which it may be inferred, that plates so prepared may be kept unimpaired as long, at least, as albumen paper ; and a further inference derived from the fact that glass contains no organic material subject to decomposition from change of temperature, would lead us to the belief in the complete permanence of the prepared film, and its imperishability if kept aloof from moisture and destructive gases.

When required for printing, a plate is sensitized by immersion in the bath which is used for sensitizing paper.

NITRATE OF SILVER BATH FOR ALBUMEN PLATES.

Nitrate of silver.....	4 ozs.
Water	24 "

One minute's immersion in this will be amply
2*

sufficient to sensitize the plate in the dark room ; after which the plate is taken out, allowed to drain, and then reared away to dry. When perfectly dry, it is submitted to the fumes of ammonia for ten minutes or a quarter of an hour ; and then, swinging the plate rapidly through the air for a moment, it is ready to be placed in the porcelain plateholder, and exposed to the light of the sun or diffused daylight. The albumen film on glass requires a little longer time to receive the impression from the negative than a similar film on paper ; owing, no doubt, to the absence of organic matter. As before observed, the progress of the printing operation can be observed from time to time with the same facility as a paper print. When the picture is sufficiently deeply printed, the plate is taken out and treated in every respect like a paper print. It is first washed, then toned in a solution of gold ; again washed, and finally fixed and washed.

The following method has been lately proposed by Mr. Crespon, of Nîmes, for taking transparent positives on glass, and which is equally available for porcelain positives.

CHLORIDIZED COLLODION.

Ether	120 drs.
Alcohol	100 "
Pyroxyline.....	3 "
Chloride of cadmium.....	2 "
Tincture of iodine.....	7 or 8 drops.

The cleaned porcelain plates are coated in the usual way with this collodion, and allowed to dry. They are next sensitized in the nitrate of silver bath, and coated while still wet, and without washing, with the following solution :

Gelatine.....	1 dr.
Honey.....	$\frac{1}{2}$ "
Water.....	30 drs.

The film is finally allowed to dry, and is then ready for exposure.

By this exposure the picture is already visible, and the printing can be carried on until the intensity is satisfactory.

The subsequent treatment of fixing and toning is precisely the same as already described.

CHAPTER V.

SECOND METHOD OF TAKING PORCELAIN PICTURES ON DRY PLATES.

THE easiest process for working with dry plates is the tannin process. The operation is quite reliable, and the results are pleasing.

HOW TO PREPARE DRY TANNIN PLATES.

Clean and polish the porcelain plates as before, then coat them with collodion in the usual way, sensitize them well until the film is creamy and free from oil marks ; then take each one out, allow it to drain, and immerse it in a dish of distilled water. Proceed in the same manner with the next plate; now take out the first plate and wash the film under the tap, and finally pour upon it a layer of distilled water and allow it to drain for a moment.

TANNIN SOLUTION.

Tannin.....	30	grs.
Loaf Sugar.....	30	"
Water	2	ozs.
Alcohol.....	15	mins.

Dissolve the tannin and sugar in the water,

and filter through a wet filter two or three times ; then add the alcohol. Cover the wet plate with this solution, and pour it into a separate vial ; cover it again with fresh tannin, and allow the residue to drain into the stock bottle. The plate is now put away to dry in the drying-chamber or box, free from dust and other sources and causes of disturbance. When dry, the plates are ready for the printing operation ; although it is better to go round the edges with a coating of albumen or of varnish, to prevent the film slipping off during development. This operation of varnishing the edge of the film is generally reserved until after exposure, and previous to development.

EXPOSURE.

The negative is placed in an ordinary printing-frame ; then comes the porcelain tannin plate, the film downward and in contact with the collodion film of the negative. The cover is then closed, and the frame is placed upon a short, thin, flat board, to exclude light. In this way it is carried into an adjoining room, or to the door or an open window, if the light is not very bright, and then lifting up the frame from the board it is exposed for a mo-

ment and again restored to its position on the thin board, and carried back into the dark room for development.

DEVELOPING SOLUTIONS.

No. 1.	{ Pyrogallic acid, 1½ grs. Alcohol absolute, 1 oz.	
No. 2.	{ Citric acid 40 grs. Nit. of silver.. 20 " Water 1 oz.	Stock solutions.
No. 3.	{ Citric acid.... 40 grs. Water 1 oz.	
No. 4.	{ Water..... 4 drs. No. 1..... 2 drops. No. 2..... 2 "	

Shake the mixture, which is always made immediately before it is required. The tannin plate is first moistened with a mixture of equal volumes of alcohol and water. This solution is then poured back into the vial, and may be used for the next plate. The film is then flowed with water to remove the oily streaks from the alcohol, and finally with the developer No. 4. If the picture is slow in appearing, add another drop of No. 1. On the contrary, if the picture appears too rapidly, add quickly a little of No. 3. Intensity is produced by means of No. 2, as soon as the picture is all

out, or by means of the ordinary pyrogallic acid developer or intensifier, which has already been given in the third chapter. The picture is then washed and fixed in a solution of hyposulphite of soda, and again washed. If the picture, however, needs more intensifying, it is better to fix the picture in a solution of cyanide of potassium, from the fact that the latter is more easily removed by washing than hyposulphite of soda.

The alkaline developer is not suitable for transparent positives on porcelain.

The picture, as thus prepared, has generally a slightly reddish tinge, which, by way of change or contrast, is sometimes very pleasing. This tone can easily be changed into one of blacker hue by the toning process with trichloride of gold already given; or by the similar application of a few drops of bichloride of mercury and of platinum in a drachm or two of water.

The picture is finally washed, dried, and varnished as usual. The shape and size of the print can be regulated by the superposition on the negative of the properly shaped mat or vignette.

Prints on albumen salted with the mixed

iodides and bromides are exceedingly rich and beautiful ; but the process is very delicate, and requires a very refined manipulation. Those desirous of trying this process will find it minutely described in the *Silver Sunbeam*.

CHAPTER VI.

HOW TO COLOR A PORCELAIN OR OPAL PICTURE.

As soon as the picture is fixed, intensified, toned, and thoroughly washed, it is, while still moist, coated with the following solution :

PRESERVATIVE SOLUTION.

Albumen (beaten to froth and clarified).	1 oz.
Pure rain-water.....	8 "

To this solution add a few small lumps of camphor, and keep in a stoppered bottle for use when required.

Pour the preservative solution upon the wet plate in the same way as you would collodion ; this solution will drive before it all the water ; allow the plate to drain for a moment, and then coat once more with the albumen, and pour the excess back again into the stoppered bottle.

The plate, so coated, is either put away to dry spontaneously in a warm corner free from dust, or dried by artificial heat over the top or on the side of the stove.

This layer, when dry, is quite hard and transparent, and is intended to preserve the collodion film, that is, the picture, from all injury when applying the color, whether in powder or liquid.

But if dry colors are used, the plate requires a further preparation for the reception and adhesion of the color. This consists in coating the plate with a varnish possessing the requisite properties.

ADHESIVE VARNISH.

Alcohol	1 oz.
Ether.....	1 dram.
Gun-cotton.....	1 gr.
Canada balsam.....	6 mins.
Bleached shellac.....	2 grs.

Coat with this mixture as with collodion, and allow the film to dry. It will possess, when dry, sufficient viscosity to cause the color to adhere with facility. This adhesion is more effective if the plate be kept warm while the color is being laid on. An excellent mode by which the coloring of ambrotypes or porcelain pictures may be much facilitated is, to cut a hole in the lid of a common school-desk for the reception of the tablets or the negative-holders. The bottom of the desk

is also removed, and a looking-glass fitted in its place below, inclined downward at an angle of 45 degrees, and looking outward. This receives the light, and, reflecting it upward, illumines the picture in a very advantageous manner for the operation in question.

The colors are laid on with a fine sable pencil, and rubbed so as to produce the proper artistic effect. When finished, the picture is varnished.

VARNISH.

White gum shellac.....	1 oz.
Gum sandarac.....	4 drms.
Canada balsam.....	1 "
Alcohol.....	20 fl. ozs.

TO TINT WITH WET COLORS.

The cakes of color required are to be rubbed up on a pallet, with the following solution :

COLOR MENSTRUUM (KOLKOW'S).

Distilled water.....	8 ozs.
Alcohol.....	4 drms.
Gum Arabic (picked)	1 oz.
Loaf sugar.....	4 drms.
Powdered alum.....	1 "

Keep this solution in a closely stoppered

bottle. If the colors are too glossy, add more water. Colors thus prepared are equally good when applied to albumen prints, and produce a very rich effect. This effect, naturally, is much heightened when the colors are laid on by an experienced artist. The picture thus colored is finally varnished and mounted.

APPENDIX.

ONE of the author's copying boxes, which he constructed five or six years ago, is simple, but not so elegant as those which can be purchased of any of our respectable photographic houses in this city, or in Boston and Philadelphia, but it is in every respect as effective, and suitable for opal pictures. The lens is one of Harrison's quarter-tubes of three inches focus ; and the largest tablet that can be used with the box is for a two-third plate. The copying box is adjusted for pictures equal in size to the negative. It consists of two cylinders of thin wood, one of which slides accurately in the other. On the end of the outer cylinder a cavity is cut for the reception of the tablets to hold the different sized negatives. These tablets require no glass corners ; and the negatives are held in their place, wrong side up, and with the collodion side toward the lens, by means of small springs of brass at the corners. Three-fourths of the

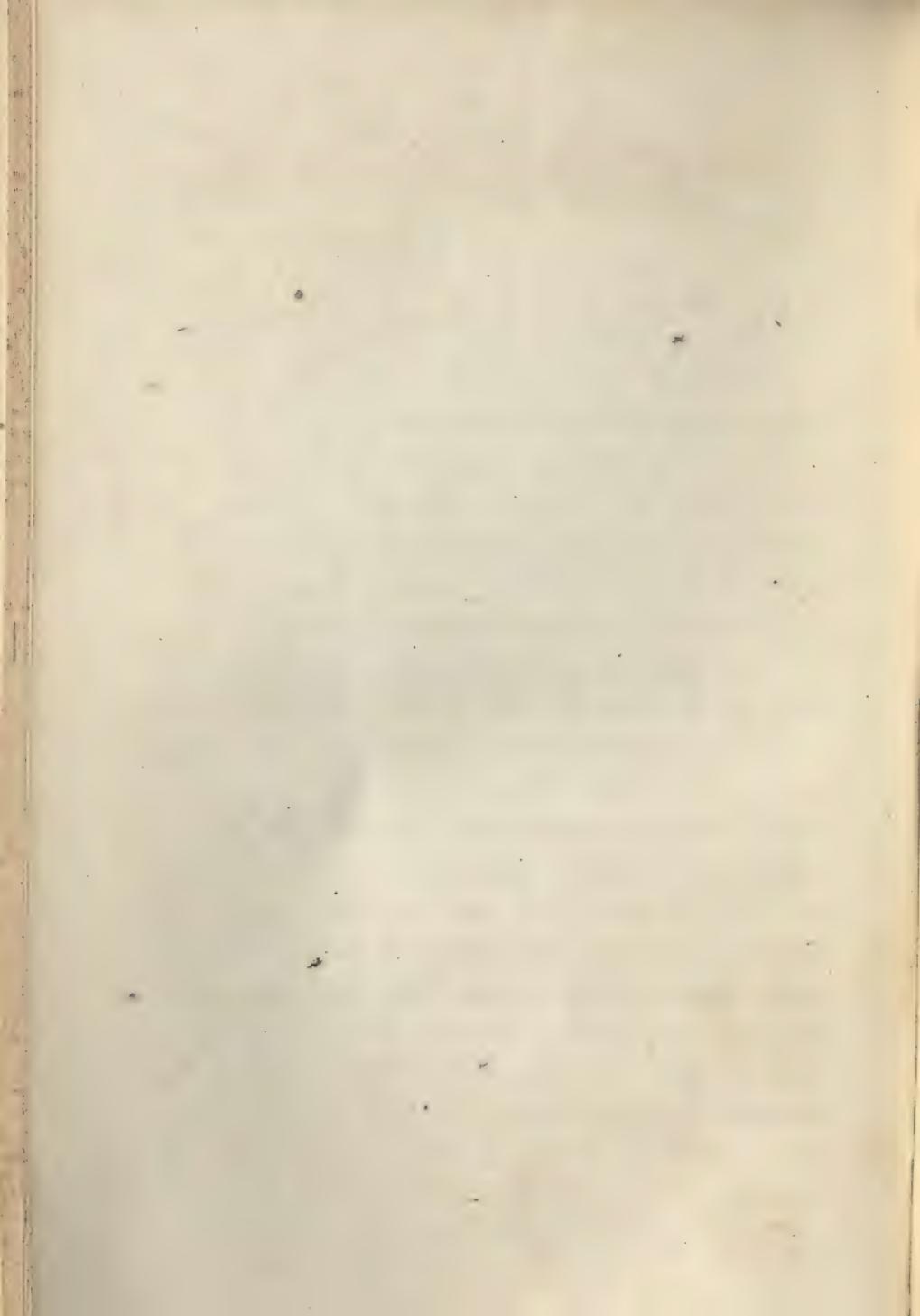
upper part of the cylinder is a lid opening on hinges. On the inside, and near the tablets, a perpendicular piece of wood, fixed on the middle of a base board the width of the bottom of the cylinder, is made to slide backward and forward, that is, nearer to or farther from the negative. The perpendicular piece has a cavity in the middle, for the reception of different sized mats and vignettes.

The lens is fixed on one end of the inner cylinder. At a distance of six inches behind the lens grooves are made to receive the plate-holders. This cylinder is pushed into the outer one, until the lens is about six inches from the negative. An accurate adjustment of the focus is obtained by sliding the inner cylinder backward and forward, until the picture is quite sharp. The distance, six inches, was determined beforehand by experiment as being that at which the picture on the negative and that on the ground glass would be equal.

The insides of the two cylinders are blackened with ink.

Any joiner would be able to construct such a copying box, and the whole cost could not exceed five dollars.

Where expense is no object, two cameras of the same dimensions, fixed endwise together, are the best and of universal use ; next to this arrangement comes the Copying Attachment. We have just been favored with one of these Camera Attachments, from the house of Willard & Co., Broadway, New York, capable of holding the following negatives : one-sixth, one-fourth, one-third, and one-half. The part for producing vignettes is ingeniously constructed, so as to hold various sized vignettes, ovals, squares, or rectangles, etc., and of being adjusted in the proper place. This attachment can be fixed on any camera in the course of a quarter of an hour, after which the operator is ready to commence experiments in the taking of porcelain pictures. It is carefully and fitly constructed, and on this account is worthy of recommendation. A white reflector at the end, as already described in a preceding chapter, would add greatly to its value, as also to the copying boxes, made by other dealers ; and we trust they will soon see fit to make this addition, which is so practically useful.



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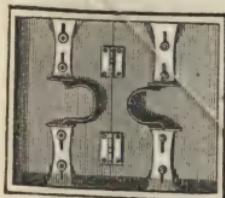
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In thus bringing this Plate before the public, they would (for the satisfaction of those who have not hitherto used or been able to procure them) enumerate its claims to their attention, viz.:-

1st—**Lightness.**

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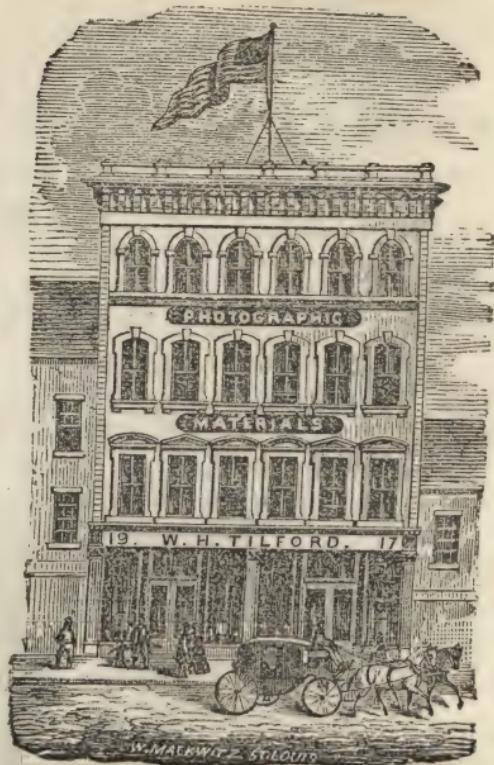
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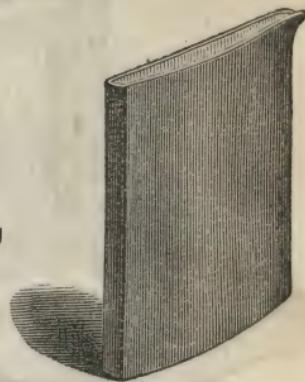
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